

DISCUSSION OF THE AMENDMENT

Due to the length of the specification herein, Applicants will cite to the paragraph number of the published patent application (PG Pub) of the present application, i.e., US 2007/0183963, when discussing the application description, both in this section and in the Remarks section, *infra*, rather than to page and line of the specification as filed.

Claim 1 has been amended by incorporating the subject matter of Claim 2 therein, and by inserting that -- the gas-permeable plates rest on the horizontal tubes or the horizontal tubes are integrated into the gas-permeable plates--, as supported in the specification at paragraph [0014]; Claim 2 has been canceled.

No new matter is believed to have been added by the above amendment. With entry thereof, Claims 1 and 3-19 will now be pending in the application.

REMARKS

The rejection of Claims 1-9 and 13-16 under 35 U.S.C. § 103(a) as unpatentable over U.S. 5,908,607 (Abekawa et al) in view of U.S. 4,499,944 (Komakine) and U.S. 5,112,593 (Itoh et al)<sup>1</sup>, is respectfully traversed.

As recited in above-amended Claim 1, an embodiment of the present invention is a reactor for preparing chlorine from hydrogen chloride by gas-phase oxidation with oxygen in the presence of a heterogeneous catalyst comprising a fluidized bed, with gas-permeable plates being located in the fluidized bed transverse to the flow direction of gas through the fluidized bed, wherein the gas-permeable plates are connected in a thermally conductive manner to a heat exchanger located in the fluidized bed, wherein the heat exchanger has tubes which run horizontally in the fluidized bed and are connected to the gas-permeable plates, wherein the thermal conductivity of the gas-permeable plates is greater than the thermal conductivity of the fluidized bed, and **wherein the gas-permeable plates rest on the horizontal tubes or the horizontal tubes are integrated into the gas-permeable plates.**

(Emphasis added.)

The advantage of the above-emphasized feature is an improved heat exchange. Additionally, the tubes running horizontally within the reactor provide for a uniform temperature distribution across the cross-section of the reactor.

A further advantage of the above-emphasized feature is that the horizontal plates prevent mixing of the catalyst, thereby preventing back-mixing of the product.

Abekawa et al discloses a process for producing chlorine by oxidizing hydrogen chloride with oxygen in the presence of a supported ruthenium compound catalyst, which may be carried out in a number of different reactors including a fluidized bed system. However, Abekawa et al does not disclose the specific configuration of the fluidized bed

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<sup>1</sup> Itoh et al has not been made of record. The Examiner is respectfully requested to cite Itoh et al on a Form PTO-892 in the next Office communication.

reactor, in which the process is carried out. More specifically, with respect to the above-amended claims, Abekawa et al does not disclose the above-emphasized feature, i.e., that gas-permeable plates rest on horizontal tubes or horizontal tubes are integrated into the gas-permeable plates.

Komakine discloses a reactor having a heat exchanger including a serpentine heat transfer tube 8 embedded in a fluidized bed in the reactor and provided with a plurality of fins 7 arranged parallel to the flow direction of the gas with stamped out pieces 7a, as shown, for example, in Figure 3 therein. Like Abekawa et al, Komakine does not disclose the above-emphasized feature of the present claims.

Itoh et al discloses a fluidized bed reactor for producing chlorine by oxidizing hydrogen chloride with oxygen in the presence of a chromium oxide-based catalyst, which reactor is equipped with perforated horizontal plates. The Examiner relies on Itoh et al for a disclosure of arranging such plates transverse to the flow direction of gas through the reactor. However, Itoh et al neither discloses nor suggests a heat exchanger integrated into the fluidized bed. It follows that Itoh et al necessarily neither discloses nor suggests the above-emphasized feature of the present claims.

Thus, even if the process of Abekawa et al were carried out in the reactor of Komakine as modified by Itoh et al, the result would still not be the presently-claimed invention.

If these references were combined by a person of ordinary skill in this art, the result would be vertical plates placed separately from the tubes of the heat exchanger. One might place the tubes of Komakine and the horizontal plates of Itoh et al into a fluidized bed reactor but would not, without the present disclosure as a guide, arrange tubes and plates in such a way that the horizontal plates rest on the horizontal tubes or the horizontal tubes are integrated into the gas-permeable plates.

In addition, Applicants repeat from prior responses that it is improper to ignore the feature that the thermal conductivity of the gas-permeable plates is greater than the thermal conductivity of the fluidized bed. While the thermal conductivity of the fluidized bed may be a property of the fluid and solid material making up the fluidized bed, this feature is still a claim limitation and cannot be ignored.

For all the above reasons, it is respectfully requested that the rejection be withdrawn.

The rejection of Claims 10-12 under 35 U.S.C. § 103(a) as unpatentable over Abekawa et al in view of Komakine and Itoh et al, and further in view of U.S. 3,708,887 (Erisman) is respectfully traversed. The Examiner relies on Erisman for a disclosure of a gas distributor plate provided with gas distributor nozzles for a fluidized bed vessel. The deficiencies in the combination of Abekawa et al, Komakine and Itoh et al have been discussed above. Erisman does not remedy these deficiencies. Thus, even if such a gas distributor plate were used in the reactor resulting from the combination of Abekawa et al, Komakine and Itoh et al, the result would still not be the presently-claimed invention. Accordingly, it is respectfully requested that the rejection be withdrawn.

Applicants respectfully call the Examiner's attention to the Information Disclosure Statement (IDS) **submitted herewith**. The Examiner is respectfully requested to initial the Form PTO 1449 submitted herewith, and include a copy thereof with the next Office communication.

Application No. 10/588,511  
Reply to Final Office Action of October 9, 2009

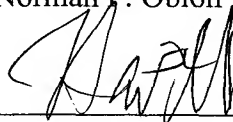
All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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